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REGIONAL MUNICIPALITY OF HALTON

BURLINGTON WATER PURIFICATION PLANT

REPORT ON THE FEASIBILITY OF ODOUR CONTROL BY POWDERED ACTIVATED CARBON

SIMCOE ENGINEERING LIMITED

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INTRODUCTION

In October, 1979, Simcoe Engineering Ltd. prepared a report entitled "Report on the Feasibility of Tertiary Treatment by Activated Carbon" which outlined the use of granular activated carbon (GAC) as a bed replacement for filters 1 - 7 at the Burlington Plant, to control odour levels in the finished water. That report briefly addressed the possibility of using powdered activated carbon (PAC) and noted that "PAC treatment is not a viable treatment, except under virtual emergency conditions".

A major drawback of the suggested GAC scheme was the requirement for a large capital investment for mechanical alterations and granular carbon purchase estimated in 1979 to total $400,000.

This report will consider the alternative of PAC treatment which will have a significantly lower initial cost.

PROPOSED TREATMENT

Since no data are available to indicate what dose of PAC would be appropriate for use at Burlington, and the use of PAC is not widespread with water from Lake Ontario, the opinion of the MOE Research Laboratory was obtained as to the likely carbon dose which would prove effective. Their opinion was that a dose of 5 - 10 ppm PAC would be effective.

Typically, odour problems occur in periods of the year where plant output is approximately equal to average day flow, and these incidents are of less than four days duration.

The proposed treatment considered therefore i this report is to store PAC in the new chemical building, together with an appropriate slurry preparation and feed system, in the unallocated area south of the

alum tanks. Sufficient PAC would be stored to allow four days continuous treatment at average day flow at a dose of 10 mg/L PAC.

PROCESS CONSIDERATIONS

The use of PAC for odour control is widespread at treatment plants where sedimentation is one of the processes used. A major disadvantage of the use of PAC at direct filtration plants is that all of the PAC added to the raw water must be removed by the filters, thus increasing the solids load to the filters and reducing the quantity of water which can be filtered before the filter needs to be backwashed.

A preliminary estimate of the effect on quantity of water filtered between washes, for doses of powdered carbon up to 10 mg/L indicates that filter runs would be reduced approximately 25% for normal raw water turbidity levels. Prior to any commitment to the PAC treatment, testing should be done at the Burlington plant to verify this estimate, and provide data to assess the effect of PAC at other doses. This testing could be conducted at pilot scale.

OTHER CONSIDERATIONS

The potential problem of powdered material consolidating during long-term storage was discussed with a supplier and the MOE Research Laboratory. Both sources stated that the material would retain its free-flowing characteristics even when stored for long periods.

Another consideration is the problem of handling of the material which is finely divided and liable to produce large quantities of dust if not handled carefully and with appropriate equipment. This matter was discussed with an equipment supplier who proposed a proprietary system which we believe would be satisfactory for the Burlington plant, for an installed cost estimated at $85,000.

SUMMARY

The following table, a comparative cost analysis, indicates the estimated annual costs for PAC treatment at two rates and for GAC treatment

as described in our 1979 report, costs shown are current.

COMPARATIVE COST ANALYSIS

	GAC SYSTEM	PAC SYSTEM 5 mg/L	PAC SYSTEM 10 mg/L
Total estimated capital cost	350,000	85,000	85,000
Provincial subsidy @ 15%	50,000	12,500	12,000
Net capital cost	$300,000	$72,500	$72,500
Annual cost of debentures 10 years @ 16%	62,000	15,000	15,000
Annual power cost*	1,000	-	-
Annual chemical cost **	-	5,000	10,000
Total annual cost	$63,000	$20,000	$25,000

* based on ten days/year carbon treatment
** based on bulk costs of $1.10/kg.

From this table it is apparent that, provided the operation of the filtration plant with shorter filter runs is acceptable, PAC treatment is a less costly option than GAC treatment, and would provide equivalent finished water quality.